AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An optical demultiplexer for separating input wavelength-multiplexed light of first and second wavelengths, said optical demultiplexer comprising:

a multi-mode propagation portion having a characteristic of allowing multi-mode propagation of light of the first and second wavelengths, and separating powers of the light of first and second wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of the powers of light in ~~the~~ said multi-mode propagation portion; and

first and second output portions for outputting the light of first and second wavelengths from ~~the~~ said multi-mode propagation portion via such positions on an output end face as to cause separation of the powers of the light of first and second wavelengths and to maximize an extinction ratio indicating the size of the power of light of a desired wavelength with respect to the power of light of a wavelength to be cut off.

2. (Previously Presented) The optical demultiplexer according to claim 1, wherein when a value of the extinction ratio corresponds to ten times the natural logarithm of the quotient obtained by dividing the power of light of the desired wavelength by the power of light of the wavelength to be cut off, the extinction ratio is equal to or more than 30dB at a position where the extinction ratio is maximized.

3. (Currently Amended) The optical demultiplexer according to claim 1, wherein a refractive index of ~~the~~ said multi-mode propagation portion is less than or equal to 2.0.

4. (Currently Amended) The optical demultiplexer according to claim 1, wherein ~~the~~ a width of ~~the~~ said multi-mode propagation portion is equal to or more than 15 μm.

5. (Currently Amended) The optical demultiplexer according to claim 1, wherein ~~the~~ said first output portion is located in a position where the power of light of the second wavelength is minimized, and

wherein ~~the~~ said second output portion is located in a position where the power of light of the first wavelength is minimized.

6. (Currently Amended) The optical demultiplexer according to claim 1, wherein in ~~the~~ a case where a phase difference between zero- and first-order modes of the first wavelength is θ_1 and a phase difference between zero- and first-order modes of the second wavelength is θ_2, ~~the~~ said multi-mode propagation portion has such an optical path length in a propagation direction as to cause a difference between θ_1 and θ_2 to be in the range of $m\pi\pm\pi/2$, where m is a natural integer.

7. (Currently Amended) The optical demultiplexer according to claim 6, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause at least one of the powers of the light of first and second wavelengths to be minimized or maximized at an output end of each of the first and second wavelengths.

8. (Currently Amended) The optical demultiplexer according to claim 7, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π.

9. (Currently Amended) The optical demultiplexer according to claim 8, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the powers of the light of first and second wavelengths to become minimum or maximum values inverted with respect to each other at the output end of each of the first and second wavelengths.

10. (Currently Amended) The optical demultiplexer according to claim 6, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the extinction ratio at the output end of each of the first and second wavelengths to become equal to or more than 30 dB.

11. (Currently Amended) The optical demultiplexer according to claim 6, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π.

12. (Currently Amended) The optical demultiplexer according to claim 6, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide,

wherein ~~the~~ a center line of the multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is offset from the optical axis.

13. (Currently Amended) The optical demultiplexer according to claim 6, wherein ~~the~~ said multi-mode propagation portion is formed by two single-mode waveguides,

wherein an axis of symmetry between ~~the~~ said two multi-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is an input end of either of ~~the~~ said two single-mode waveguides.

14. (Currently Amended) The optical demultiplexer according to claim 1, wherein the multi-mode propagation portion includes:

a first optical path length portion having an optical path length in a propagation direction such that, in ~~the~~ a case where a phase difference between zero- and first-order modes of the first wavelength is θ_1 and a phase difference between zero- and first-order modes of the second wavelength is θ_2, a difference between θ_1 and θ_2 is in the range of $m\pi\pm\pi/2$, where m is a natural integer; and

a second optical path length portion having an optical path length in the propagation direction such that the difference between θ_1 and θ_2 is in the range of $m\pi\pm\pi/2$,

wherein light of the first wavelength is outputted from ~~the~~ said first optical path length portion,

wherein light of the second wavelength is outputted from ~~the~~ said second optical path length portion, and

wherein ~~the~~ said first and second optical path length portions have different optical path lengths.

15. (Currently Amended) The optical demultiplexer according to claim 14, wherein ~~the~~ said first optical path length portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π, and

wherein ~~the~~ said second optical path length portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π.

16. (Currently Amended) The optical demultiplexer according to claim 14, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide,

wherein ~~the~~ a center line of ~~the~~ said multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is offset from the optical axis.

17. (Currently Amended) The optical demultiplexer according to claim 14, wherein ~~the~~ said multi-mode propagation portion is formed by two single-mode waveguides having different lengths, and

wherein an axis of symmetry between ~~the~~ said two multi-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

18. (Currently Amended) The optical demultiplexer according to claim 1, wherein ~~the~~ said multi-mode propagation portion has an optical path length in a propagation direction such that, in ~~the~~ a case where a phase difference between zero- and first-order modes of the first wavelength is θ_1 and a phase difference between zero- and first-order modes of the second wavelength is θ_2, a difference between θ_1 and θ_2 is in the range of $m\pi\pm\pi/2$, where m is a natural integer, and

wherein ~~the~~ said multi-mode propagation portion includes:

a first multi-mode region ~~capable of transmitting~~ operable to transmit therethrough only multi-mode light of a shorter one of the first and second wavelengths; and

a second multi-mode region ~~capable of transmitting~~ operable to transmit therethrough multi-mode light of the first and second wavelengths, ~~the~~ said second multi-mode region being ~~present~~ located downstream in a traveling direction of light from ~~the~~ said first multi-mode region.

19. (Currently Amended) The optical demultiplexer according to claim 18, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π.

20. (Currently Amended) The optical demultiplexer according to claim 18, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide, and

wherein ~~the~~ said first and second multi-mode regions are formed by cutting out a portion having a rectangular solid-shape from the input side of ~~the~~ said multi-mode waveguide, such that ~~the~~ said first multi-mode region becomes partially narrower than ~~the~~ said second multi-mode region.

21. (Currently Amended) The optical demultiplexer according to claim 20, wherein the input position is offset from the optical axes of ~~the~~ said first and second multi-mode regions.

22. (Currently Amended) The optical demultiplexer according to claim 18, wherein ~~the~~ said first multi-mode region is formed by two former-stage single-mode waveguides used as a former-stage multi-mode region,

wherein ~~the~~ said second multi-mode region is formed by two latter-stage single-mode waveguides used as a latter-stage multi-mode region, and

wherein a space between ~~the~~ said former-stage single-mode waveguides is narrower than a space between ~~the~~ said latter-stage single-mode waveguides.

23. (Currently Amended) The optical demultiplexer according to claim 18, wherein the centers of the axes of ~~the~~ said first and second multi-mode regions are offset from each other.

24. (Currently Amended) The optical demultiplexer according to claim 1, wherein in ~~the~~ a case where a phase difference between zero- and first-order modes of the first wavelength is θ_1 and a phase difference between zero- and first-order modes of the second wavelength is θ_2, ~~the~~ said multi-mode propagation portion has such an optical path length in a propagation direction as to cause a difference between θ_1 and θ_2 to be in the range of $m\pi\pm\pi/2$, where m is a natural integer, and

wherein ~~the~~ a width of ~~the~~ said multi-mode propagation portion varies along a direction of an optical axis of ~~the~~ said optical demultiplexer.

25. (Currently Amended) The optical demultiplexer according to claim 24, wherein ~~the~~ said multi-mode propagation portion has such an optical path length in the propagation direction as to cause the difference between θ_1 and θ_2 to become an integral multiple of π.

26. (Currently Amended) The optical demultiplexer according to claim 24, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide, and

wherein ~~the~~ a center line of ~~the~~ said multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

27. (Currently Amended) The optical demultiplexer according to claim 24, wherein ~~the~~ said multi-mode propagation portion is formed by two single-mode waveguides, and

wherein an axis of symmetry between ~~the~~ said two multi-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

28. (Currently Amended) The optical demultiplexer according to claim 1, further comprising:

a first latter-stage multi-mode propagation portion provided at an output end of ~~the~~ said first output portion, ~~the~~ said first latter-stage multi-mode propagation portion having the same characteristic as that of ~~the~~ said multi-mode propagation portion;

a second latter-stage multi-mode propagation portion provided at an output end of ~~the~~ said second output portion, ~~the~~ said second latter-stage multi-mode propagation portion having the same characteristic as that of ~~the~~ said multi-mode propagation portion;

a first latter-stage output portion for outputting light of the first wavelength to be separated by ~~the~~ said first latter-stage multi-mode propagation portion; and

a second latter-stage output portion for outputting light of the second wavelength to be separated by ~~the~~ said second latter-stage multi-mode propagation portion.

29. (Currently Amended) The optical demultiplexer according to claim 1, further comprising an external electric field control section for applying an external electric field to ~~the~~ said multi-mode propagation portion, wherein ~~the~~ said multi-mode propagation portion is formed of an electro-optic material.

30. (Currently Amended) The optical demultiplexer according to claim 29, wherein ~~the~~ said external electric field control section includes:

a pair of electrodes provided on a surface of the multi-mode propagation portion; and

an external voltage control section for controlling a voltage between ~~the~~ said pair of electrodes.

31. (Currently Amended) The optical demultiplexer according to claim 1, further comprising an external temperature control section for controlling the temperature of ~~the~~ said multi-mode propagation portion, wherein ~~the~~ said multi-mode propagation portion is formed of a thermo-optic material having a temperature dependence.

32. (Currently Amended) The optical demultiplexer according to claim 31, wherein ~~the~~ said external temperature control section includes:

a heat conducting member provided on a surface of ~~the~~ said multi-mode propagation portion; and

a temperature control member for controlling the temperature of said ~~the~~ multi-mode propagation portion by at least one of heating ~~and/or~~ and cooling ~~the~~ said heat conducting ~~portion~~member.

33. (Currently Amended) The optical demultiplexer according to claim 31, wherein ~~the~~ said external temperature control section includes:

a Peltier device provided on a surface of ~~the~~ said multi-mode propagation portion; and

a temperature control member for controlling the temperature of said ~~the~~ multi-mode propagation portion by applying a current to ~~the~~ said Peltier device.

34. (Currently Amended) The optical demultiplexer according to claim 1,

wherein ~~the~~ said input portion is a waveguide optically coupled to the input side of ~~the~~ said multi-mode propagation portion, and

wherein each of ~~the~~ said first and second output portions is a waveguide optically coupled to the output side of ~~the~~ said multi-mode propagation portion.

35. (Currently Amended) An optical device for transmitting/receiving light of first and second wavelengths, ~~the~~ said optical device comprising:

a multi-mode propagation portion allowing multi-mode propagation of light of the first and second wavelengths, and separating powers of the light of first and second wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of the powers of light in ~~the~~ said multi-mode propagation portion;

first and second output portions for outputting the light of first and second wavelengths from ~~the~~ said multi-mode propagation portion via such positions on an output end face as to cause separation of the powers of the light of first and second wavelengths and to maximize an extinction ratio indicating the size of the power of light of a desired wavelength with respect to the power of light of a wavelength to be cut off;

a first optical element for at least one of receiving ~~and/or~~ and emitting light of the first wavelength, ~~the~~ said first optical element being provided at an output end of ~~the~~ said first output portion; and

a second optical element for at least one of receiving ~~and/or~~ and emitting light of the second wavelength, ~~the~~ said second optical element being provided at an output end of ~~the~~ said second output portion.

36. (Currently Amended) The optical device according to claim 35, wherein ~~the~~ said second optical element includes:

a light emitting portion for emitting light of the second wavelength; and

a light receiving portion for receiving light of the second wavelength.

37. (Currently Amended) An optical demultiplexer for separating input wavelength-multiplexed light of n types of different wavelengths, where n is a natural integer, ~~the~~ said optical demultiplexer comprising:

a multi-mode propagation portion allowing multi-mode propagation of the input wavelength-multiplexed light of n types of different wavelengths, and separating powers of the light of n types of different wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of the powers of light in ~~the~~ said multi-mode propagation portion; and

n output portions for outputting the light of n types of different wavelengths from ~~the~~ said multi-mode propagation portion via such positions on an output end face as to cause separation of the powers of the light of n types of different wavelengths and to maximize an extinction ratio indicating the size of the power of light of a desired wavelength with respect to the power of light of a wavelength to be cut off.

38. (Currently Amended) The optical demultiplexer according to claim 37, wherein in ~~the~~ a case where i=0,1,...,n and k=1, 2,...,n-1, when a phase difference between i'th- and i+1'th-order modes of a k'th wavelength λ_k is θ_k and a phase difference between i'th- and i+1'th-order modes of a k+1'th wavelength λ_{k+1} is θ_{k+1}, ~~the~~ said multi-mode propagation portion has such an optical path length in a propagation direction as to cause a difference between θ_k and θ_{k+1} ~~as~~ to be in the range of $m\pi\pm\pi/2$, where m is a natural integer.

39. (Currently Amended) The optical demultiplexer according to claim 38, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide,

wherein ~~the~~ a center line of ~~the~~ said multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is offset from the optical axis.

40. (Currently Amended) The optical demultiplexer according to claim 38, wherein ~~the~~ said multi-mode propagation portion is formed by n single-mode waveguides, and

wherein an axis of symmetry between outermost single-mode waveguides among ~~the~~ said n single-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

41. (Currently Amended) The optical demultiplexer according to claim 40, wherein ~~the~~ said n single-mode waveguides are equally spaced.

42. (Previously Presented) The optical demultiplexer according to claim 37, wherein the n types of different wavelengths are equally spaced.

43. (Currently Amended) An optical multi-/demultiplexer for combining/separating light of first and second wavelengths, ~~the~~ said optical multi-/demultiplexer comprising:

a multi-mode propagation portion allowing multi-mode propagation of the light of first and second wavelengths, and separating powers of the light of first and second wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of the powers of light in ~~the~~ said multi-mode propagation portion; and

first and second output portions for outputting the light of first and second wavelengths from ~~the~~ said multi-mode propagation portion via such positions on an output end face as to cause separation of the powers of the light of first and second wavelengths and to maximize an extinction ratio indicating the size of the power of light of a desired wavelength with respect to the power of light of a wavelength to be cut off.

44. (Currently Amended) An optical multi-/demultiplexer for combining/separating light of n types of different wavelengths, where n is a natural integer, ~~the~~ said optical multi-/demultiplexer comprising:

a multi-mode propagation portion allowing multi-mode propagation of the light of n types of different wavelengths, and separating powers of the light of n types of different wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of the powers of light in ~~the~~ said multi-mode propagation portion; and

n output portions for outputting the light of n types of different wavelengths from ~~the~~ said multi-mode propagation portion via such positions on an output end face as to cause separation of the powers of the light of n types of different wavelengths and to maximize an extinction ratio indicating the size of the power of light of a desired wavelength with respect to the power of light of a wavelength to be cut off.

45. (Currently Amended) An optical device for adjusting wavelength-multiplexed light of n types of wavelengths, where n is a natural integer, ~~the~~ said optical device comprising:

a demultiplexing section for separating the light of n types of wavelengths;

a multiplexing section for combining the light of n types of wavelengths; and

n adjusting sections for adjusting light of the n types of wavelengths separated by ~~the~~ said demultiplexing section and inputting the light of the n types of wavelengths to ~~the~~ said multiplexing section,

wherein ~~the~~ said demultiplexing section includes a demultiplexer multi-mode propagation portion allowing multi-mode propagation of the light of n types of wavelengths, and separating powers of the light of n types of wavelengths by causing internal mode interference,

wherein ~~the~~ said multiplexing section includes a multiplexer multi-mode propagation portion allowing multi-mode propagation of the light of n types of wavelengths, and combining powers of light of the n types of wavelengths by causing internal mode interference, and

wherein in ~~the~~ a case where i=0,1,...,n and k=1, 2,...,n-1, when a phase difference between i'th- and i+1'th-order modes of a k'th wavelength λ_k is θ_k and a phase difference between i'th- and i+1'th-order modes of a k+1'th wavelength λ_{k+1} is θ_{k+1}, each of ~~the~~ said demultiplexer and multiplexer multi-mode propagation portions has such an optical path length in a propagation direction as to cause a difference between θ_k and θ_{k+1} to be in the range of $m\pi\pm\pi/2$, where m is a natural integer.

46. (Currently Amended) The optical device according to claim 45, wherein each of ~~the~~ said n adjusting sections adjusts at least one of a gain, a phase, and a polarized status for each wavelength.

47. (Currently Amended) The optical device according to claim 45, further comprising an external control section, wherein ~~the~~ said external control section is able to communicate with each of ~~the~~ said n adjusting sections so as to dynamically adjust at least one of a gain, a phase, and a polarized status for each wavelength.

48. (Currently Amended) The optical device according to claim 45, further comprising:

an external control section; and

a monitor section for monitoring the output of ~~the~~ said multiplexer multi-mode propagation portion,

wherein said ~~the~~ external control section is able to communicate with each of ~~the~~ said n adjusting sections and ~~the~~ said monitor section and to feed back an output status of ~~the~~ said multiplexer multi-mode propagation portion so as to dynamically adjust at least one of a gain, a phase, and a polarized status for each wavelength.

49. (Currently Amended) An optical device having an add/drop function of extracting one of two wavelengths multiplexed in light and recombining the two wavelengths, ~~the~~ said optical device comprising:

a demultiplexer for separating light of the two wavelengths;

a multiplexer for combining light of the two wavelengths;

a relay waveguide for relaying light of a first wavelength in wavelength-multiplexed light to ~~the~~ said multiplexer, ~~the~~ said relay waveguide being connected to the output side of ~~the~~ said demultiplexer;

a drop waveguide for guiding light of a second waveguide in the wavelength-multiplexed light to the outside of ~~the~~ said demultiplexer, ~~the~~ said drop waveguide being connected to the output side of ~~the~~ said demultiplexer; and

an add waveguide for guiding the light of the second wavelength back into ~~the~~ said demultiplexer and relaying the light to ~~the~~ said multiplexer,

wherein ~~the~~ said demultiplexer includes a demultiplexer multi-mode propagation portion allowing multi-mode propagation of light of the first and second wavelengths, and separating powers of the light of the first and second wavelengths by causing internal mode interference,

wherein ~~the~~ said multiplexer includes a multiplexer multi-mode propagation portion allowing multi-mode propagation of the light of the first and second wavelengths, and combining the powers of the light of the first and second wavelengths by causing internal mode interference, and

wherein in ~~the~~ a case where a phase difference between zero- and first-order modes of the first wavelength is θ_1 and a phase difference between zero- and first-order modes of the second wavelength is θ_2, each of ~~the~~ said demultiplexer and multiplexer multi-mode propagation portions has such an optical path length in a propagation direction as to cause a difference between θ_1 and θ_2 to be in the range of $m\pi\pm\pi/2$, where m is a natural integer.

50. (Currently Amended) An optical demultiplexer for separating, into two groups of wavelengths, input wavelength-multiplexed light of 2n types of different wavelengths $\lambda_1,\ldots,\lambda_{2n}$, where n is a natural integer, ~~the~~ said optical demultiplexer comprising:

a multi-mode propagation portion having a characteristic of allowing multi-mode propagation of light of the 2n types of different wavelengths in the input wavelength-multiplexed light, and separating powers of light of the two groups of wavelengths by causing internal mode interference;

an input portion for inputting light to ~~the~~ said multi-mode propagation portion from such an input position as to cause separation of powers of light in ~~the~~ said multi-mode propagation portion; and

two output portions for outputting the light of the two groups of wavelengths from such positions as to cause separation of the powers of the light of the two groups of wavelengths,

wherein the two groups of wavelengths consist of the group of odd-numbered multiplexed wavelengths and the group of even-numbered multiplexed wavelengths.

51. (Currently Amended) The optical demultiplexer according to claim 50, wherein in ~~the~~ a case where k=1, 2,...,n-1, when a phase difference between zero- and first-order modes of a 2k-1'th wavelength λ_{2k-1} is θ_{2k-1} and a phase difference between zero- and first-order modes of a 2k'th wavelength λ_{2k} is θ_{2k}, ~~the~~ said multi-mode propagation portion has such an optical path length in a propagation direction as to cause a difference between θ_{2k-1} and θ_{2k} to be in the range of $m\pi\pm\pi/2$, where m is a natural integer.

52. (Currently Amended) The optical demultiplexer according to claim 51, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide,

wherein ~~the~~ a center line of ~~the~~ said multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is offset from the optical axis.

53. (Currently Amended) The optical demultiplexer according to claim 51, wherein ~~the~~ said multi-mode propagation portion is formed by two single-mode waveguides having different lengths, and

wherein an axis of symmetry between ~~the~~ said two single-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

54. (Currently Amended) The optical demultiplexer according to claim 50, wherein in ~~the~~ a case where k=1, 2,...,n-1, when a phase difference between zero- and first-order modes of a 2k-1'th wavelength λ_{2k-1} is θ_{2k-1} and a phase difference between zero- and first-order modes of a 2k'th wavelength λ_{2k} is θ_{2k}, ~~the~~ said multi-mode propagation portion includes:

a first optical path length portion having such an optical path length in a propagation direction as to cause a difference between θ_{2k-1} and θ_{2k} to be in the range of $m\pi\pm\pi/2$, where m is a natural integer; and

a second optical path length portion having such an optical path length in the propagation direction as to cause a difference between θ_{2k-1} and θ_{2k} to be in the range of $m\pi\pm\pi/2$,

wherein the group of the odd-numbered multiplexed wavelengths is outputted from ~~the~~ said first optical path length portion,

wherein the group of the even-numbered multiplexed wavelengths is outputted from ~~the~~ said second optical path length portion, and

wherein ~~the~~ said first and second optical path length portions have different optical path lengths.

55. (Currently Amended) The optical demultiplexer according to claim 54, wherein ~~the~~ said multi-mode propagation portion is formed by one multi-mode waveguide,

wherein ~~the~~ a center line of ~~the~~ said multi-mode waveguide corresponds to an optical axis of ~~the~~ said multi-mode propagation portion, and

wherein the input position is offset from the optical axis.

56. (Currently Amended) The optical demultiplexer according to claim 54, wherein ~~the~~ said multi-mode propagation portion is formed by two single-mode waveguides having different lengths, and

wherein an axis of symmetry between ~~the~~ said two single-mode waveguides corresponds to an optical axis of ~~the~~ said multi-mode propagation portion.

57. (Previously Presented) The optical demultiplexer according to claim 50, wherein the 2n types of wavelengths are equally spaced.

58. (Currently Amended) The optical demultiplexer according to claim 50, wherein a refractive index of ~~the~~ said multi-mode propagation portion is in linear relationship with a wavelength in at least n types of wavelength ranges.

59. (Currently Amended) The optical demultiplexer according to claim 50, wherein n is a number which satisfies n=4k, where k is a natural integer, and

wherein ~~the~~ said optical demultiplexer further comprises:

a first latter-stage multi-mode propagation portion optically connected to an output end of ~~the~~ one of said output ~~portion~~ portions for guiding the group of odd-numbered multiplexed wavelengths and having the same characteristic as that of ~~the~~ said multi-mode propagation portion;

a second latter-stage multi-mode propagation portion optically connected to ~~the~~ an output end of the other one of said output ~~portion~~ portions for guiding the group of even-numbered multiplexed wavelengths and having the same characteristic as that of ~~the~~ said multi-mode propagation portion;

a first latter-stage output portion for outputting the group of 4k-3'th wavelengths separated by ~~the~~ said first latter-stage multi-mode propagation portion;

a second latter-stage output portion for outputting the group of 4k-1'th wavelengths separated by ~~the~~ said first latter-stage multi-mode propagation portion;

a third latter-stage output portion for outputting the group of 4k-2'th wavelengths separated by ~~the~~ said second latter-stage multi-mode propagation portion; and

a fourth latter-stage output portion for outputting the group of 4k'th wavelengths separated by ~~the~~ said second latter-stage multi-mode propagation portion.

60. (Currently Amended) An optical demultiplexer for separating input wavelength-multiplexed light of first and second wavelengths, ~~the~~ said optical demultiplexer comprising:

a first multi-mode propagation portion for separating powers of light of third and fourth wavelengths by causing internal mode interference, the third wavelength being offset from the first wavelength by a prescribed wavelength, the fourth wavelength being offset from the second wavelength by a prescribed wavelength,

an input portion for inputting light to ~~the~~ said first multi-mode propagation portion from such an input position as to cause separation of powers of light in ~~the~~ said first multi-mode propagation portion;

a first output portion provided to an output end face of ~~the~~ said first multi-mode propagation portion in such a position as to cause separation of the powers of light of the third and fourth wavelengths and to maximize an extinction ratio indicating the size of the power of light of the fourth wavelength with respect to the power of light of the third wavelength;

a second output portion provided to the output end face of ~~the~~ said first multi-mode propagation portion in such a position as to cause separation of the powers of light of the third and fourth wavelengths and to maximize the extinction ratio indicating the size of the power of light of the fourth wavelength with respect to the power of light of the third wavelength;

second and third multi-mode propagation portions each separating powers of light of fifth and sixth wavelengths by causing internal mode interference, the fifth wavelength being offset from the first wavelength by a prescribed wavelength in a direction opposite to a direction of the offset of the third wavelength, the sixth wavelength being offset from the second wavelength by a prescribed wavelength in a direction opposite to a direction of the offset of the fourth wavelength;

a third output portion provided to an output end face of ~~the~~ said second multi-mode propagation portion in such a position as to cause separation of powers of light of the fifth and sixth wavelengths and to maximize the extinction ratio indicating the size of the power of light of the sixth wavelength with respect to the power of light of the fifth wavelength; and

a fourth output portion provided to an output end face of ~~the~~ said third multi-mode propagation portion in such a position as to cause separation of the powers of light of the fifth and sixth wavelengths and to maximize the extinction ratio indicating the size of the power of light of the sixth wavelength with respect to the power of light of the fifth wavelength.

61. (Previously Presented) The optical demultiplexer according to claim 60,

wherein the third and fifth wavelengths are symmetric with respect to the first wavelength, and

wherein the forth and sixth wavelengths are symmetric with respect to the second wavelength.